



## Office of Nuclear Material Safety and Safeguards Procedure Approval

### ***Reviewing the Non-Common Performance Indicator, Low-Level Radioactive Waste Disposal Program State Agreements (SA) Procedure SA-109***

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Michael C. Layton  
*Director, NMSS/MSST*

Michael C. Layton

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Lizette Roldan-Otero, Ph.D.  
*Acting Branch Chief, NMSS/MSST/SALB*

Lizette Roldan-Otero

Digitally signed by Lizette Roldan-Otero  
Date: 2020.08.27 13:01:18 -05'00'

*Date:*

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Duncan White  
*Procedure Contact, NMSS/MSST/SALB*

Alfred  
White

Digitally signed  
by Alfred White  
Date:  
2020.08.27  
13:51:21 -04'00'

*Date:*

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David Crowley  
*Chair, Organization of Agreement States*

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*Date:* 9/15/2020

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**ML20184A085**

#### **NOTE**

***Any changes to the procedure will be the responsibility of the NMSS Procedure Contact. Copies of NMSS procedures are available through the NRC Web site at <https://scp.nrc.gov>***

## **I. INTRODUCTION**

This document describes the procedure for conducting reviews of an Agreement State radiation control program (Agreement State Program) for the Non-Common Performance Indicator, Low-Level Radioactive Waste (LLRW) Disposal Program as specified in the U.S. Nuclear Regulatory Commission (NRC) Management Directive (MD) 5.6, *Integrated Materials Performance Evaluation Program* (IMPEP).

## **II. OBJECTIVES**

To determine that an Agreement State's regulatory oversight of a LLRW Disposal Program is adequate to protect public health, safety, security, and the environment. Five sub-elements are reviewed: (1) Technical Staffing and Training; (2) Status of the LLRW Disposal Inspection Program; (3) Technical Quality of Inspections; (4) Technical Quality of Licensing Actions; and (5) Technical Quality of Incident and Allegation Activities. The review will confirm that the following objectives have been met:

- A. That qualified and trained technical staff are available to license, regulate, inspect, and assess the operation and performance of the LLRW disposal facility. The evaluation of staffing and training performance is reviewed according to State Agreements Procedure (SA) SA-103, *Reviewing the Common Performance Indicator, Technical Staffing and Training*; Inspection Manual Chapter (IMC) 1248, *Formal Qualifications Program for Federal and State Material and Environmental Management Programs*; and this procedure.
- B. That the LLRW disposal facility is inspected at prescribed frequencies as stated in IMC 2401, *Near-Surface Low-Level Radioactive Waste Disposal Facility Inspection Program*, and to verify that statistical data on the status of the inspection program is maintained and can be retrieved, as generally assessed according to SA-101, *Reviewing the Common Performance Indicator, Status of Materials Inspection Program*, and this procedure.
- C. That the technical quality of LLRW disposal inspections is adequate, as generally assessed according to SA-102, *Reviewing the Common Performance Indicator, Technical Quality of Inspections*, and this procedure.
- D. That the technical quality of licensing actions is adequate, as generally assessed according to SA-104, *Reviewing the Common Performance Indicator, Technical Quality of Licensing Actions*, and this procedure.
- E. That the response to incidents and allegations is adequate, as generally assessed according to SA-105, *Reviewing the Common Performance Indicator, Technical Quality of Incident and Allegation Activities*, and this procedure.

### **III. BACKGROUND**

For the purposes of this procedure, the evaluation of the Agreement State Program for the regulation of a LLRW disposal facility is best accomplished by considering the facility at one of two phases: operations or closure. The operations phase would be those periods where the facility is undergoing pre-operations (e.g., initial licensing, construction), operations (e.g., waste receipt and disposal), through preparation for site closure. During this phase, the licensee (or operator) has an active presence at the site and the facility actively operates under a license and is subject to regulation by the Agreement State Program. The terms “facility” and “site” may be used interchangeably in this procedure.

The closure phase refers to the period when the facility has entered the post-closure period (see Title 10 of the *Code of Federal Regulations* (10 CFR) Part 61.29) and then the institutional control period. During these periods activities at the site are reduced and generally limited to observation, monitoring and maintenance and repair, first by the licensee (post-closure) and then the facility owner (institutional control). During the 5-year post-closure period (active maintenance period), the activities at the site are described by and specified in the licensee’s site closure plan.

### **IV. ROLES AND RESPONSIBILITIES**

#### **A. IMPEP Review Team Leader (Team Leader)**

1. In coordination with the IMPEP Program Manager, the Team Leader determines which team member is assigned lead review responsibility and assigns other team members to provide support, as necessary.
2. Assists in developing a plan to conduct further review or to identify root causes for any potential health, safety, security, or environmental protection issues identified by the review.
3. Communicates the team’s findings to Agreement State Program management and ensures that the team’s findings are in alignment with MD 5.6.
4. Determines, in coordination with NRC headquarters, if this performance indicator will be reviewed. This procedure allows for the option to not review a LLRW disposal facility that is in the closure phase provided there have been no changes or issues since the last IMPEP review that would impact safety. For example, a LLRW disposal facility that is in the closure phase and there have been no changes to releases to the environment, no problems with the engineered cap, and no incidents (e.g., fire, earthquake, etc.).

#### **B. Reviewer**

1. Coordinates with the Team Leader to determine which Program inspector(s) to accompany. Conducts inspector accompaniments (unless they are

conducted by an alternate team member) before the on-site portion of the review.

2. Reviews each sub-element in accordance with this procedure.
3. Informs the Team Leader of their findings throughout the review.
4. Presents the results of the team's review to the Agreement State Program at the staff exit meeting.
5. Completes their portion of the IMPEP report for the LLRW Disposal Program performance indicator.
6. Attends the Management Review Board meeting and discusses the team's findings (this can be done either in-person or remotely).

## **V. GUIDANCE**

### **A. Scope**

1. This procedure applies to the review of the LLRW Disposal Program. In particular, the procedure applies to activities involving licensing, management, operation, inspection, closure, and post-closure of radioactive waste disposal under NRC's 10 CFR Part 61 or equivalent Agreement State regulations.
2. The regulation of radioactive materials, waste disposal, and waste processing facilities that do not fall under the NRC's 10 CFR Part 61 or equivalent Agreement State regulations should be reviewed under the appropriate IMPEP common performance indicators. Radioactive waste processors are service provider licensees and are issued a 10 CFR Part 30 license.
3. The review of program elements (including regulations) required for compatibility are not within the scope of this indicator but are addressed under the non-common performance indicator, Legislation, Regulations and Other Program Elements.
4. The scope of the review of the LLRW Disposal Program should consider the phase(s) within the review period.
5. This procedure evaluates the Agreement State's performance over the period since the last IMPEP review. This time frame is defined as the review period.
6. The review guidelines below are examples of evaluation elements and are not requirements.

### **B. Preparation**

1. Review MD 5.6, IMC 2401, and be knowledgeable of the applicable IMPEP SA procedures, the basic regulatory guides involving LLRW disposal siting,

licensing, environmental impacts, performance assessment, waste characterization, and waste averaging. Review the list of reference documents located in the IMPEP Toolbox on the state communications portal Web site. These pertinent reference documents will be dependent on the LLRW disposal facility status.

2. Coordinate with the Team Leader, and the appropriate Agreement State personnel to accompany State inspectors during an inspection of the LLRW disposal facility before the on-site portion of the IMPEP review.
3. Request a copy of the current radioactive materials license, the last inspection report, a map of the LLRW disposal facility and disposal trenches, and related Agreement State procedures from the Agreement State Program prior to the on-site review.
4. Request the following documentation from the Team Leader prior to the on-site review:
  - a. Obtain a copy of the periodic meeting summaries for the review period to determine any new issues associated with the LLRW Disposal Program.
  - b. Obtain a copy of the last IMPEP report and identify any open issues or recommendations for this indicator.
5. Request a list of allegations referred to the State regarding the LLRW Disposal Program by the NRC from the Regional State Agreements Officer (RSAO) or the headquarters allegation team prior to the on-site review.
  - a. Obtain a list of incidents related to the LLRW Disposal Program. A list of incidents can be found in Nuclear Materials Event Database (NMED).
  - b. Review the responses generated by the Agreement State Program, relevant to LLRW disposal questions in the IMPEP questionnaire.

**C. Reviewer Actions by Sub-element During the Operations Phase**

The following describe reviewer actions in accordance with each sub-element for the evaluation of the Program's oversight of a LLRW disposal facility in the operations phase.

**1. Technical Staffing and Training (see SA-103)**

The reviewer(s) should ensure that all technical staff involved in the LLRW Disposal Program have completed training in accordance with Appendix E of IMC 1248.

- a. Based on the LLRW disposal facility activities, the reviewer(s) should ensure there are staff (or access to staff in other divisions, departments, agencies, or with consultants) available with expertise, as needed, in materials licensing and inspection; health physics and radiation

protection; radioactive materials' transportation and inspection; civil (geotechnical) and mechanical engineering; geology or geochemistry, surface water and ground water hydrology; chemical safety; and environmental science. The reviewer should conduct interviews with staff to evaluate qualifications and potential needs.

- b. The reviewer(s) should ensure the LLRW Disposal Program has a plan and schedule for development and implementation of a training program for the staff. The reviewer(s) should ensure records of staff training and qualification records include refresher training (e.g., radiation protection, transportation, treatment, storage, and disposal of radioactive waste, as well as environmental monitoring aspects).
- c. The reviewer(s) should ensure technical staff, conducting performance assessment reviews, receive training in risk and performance assessment, and are made aware of NUREG-2175, *Guidance for Conducting Technical Analyses for 10 CFR Part 61* and NUREG-1573, *A Performance Assessment Methodology for Low-Level Radioactive Waste Disposal Facilities: Recommendations of NRC's Performance Assessment Working Group*. The reviewer(s) should ensure technical staff are aware of NRC's risk informed performance-based approaches and probabilistic risk assessment methods. The Agreement State Program may utilize other divisions, departments, agencies, or with consultants for performing this work.

2. Status of the LLRW Disposal Inspection Program (see SA-101)

- a. Inspections may include the following:
  - i. site security and site boundaries;
  - ii. inspection of trenches and disposal cells;
  - iii. waste shipments;
  - iv. waste manifest;
  - v. waste characteristics and volumes;
  - vi. shipment vehicle surveys and records;
  - vii. release surveys for equipment, structures, and vehicles;
  - viii. waste packages; marking, labeling, and placarding;
  - ix. emergency response information; general shipping inspections for compliance with regulatory requirements by Department of Transportation (DOT), NRC, and Agreement State;
  - x. personnel exposures and dosimetry (e.g., internal, bioassay, and external dosimetry);
  - xi. personnel qualifications and training;

- xii. air monitoring surveys;
- xii. radiological surveys;
- xiii. surface water and ground water monitoring;
- xiv. emergency response plans and drills;
- xv. waste receipt, treatment, storage, and disposal operations;
- xvi. instrument calibrations and check sources;
- xvii. radiological posting;
- xviii. respiratory protections;
- xix. As Low As is Reasonably Achievable (ALARA) records; and
- xx. records of incidents and allegations.

b. The reviewer(s) should:

- i. Evaluate inspections and assess the adequacy and frequency needed for safety, security, and to demonstrate compliance with regulatory requirements and license conditions.
- ii. Use inspection data provided by the Agreement State Program from the IMPEP questionnaire and information provided during the onsite review. The Agreement State Program should not be penalized for failing to meet internally developed inspection schedules that are more restrictive or stringent than those specified in IMC 2401.
- iii. Evaluate inspections in comparison to IMC 2401 and note any missed, late, or overdue inspections during the IMPEP review period. In this regard, the reviewer(s) should review the license, license conditions and amendments, and current LLRW disposal activities.

3. Technical Quality of LLRW Disposal Inspections (see SA-102)

- a. The reviewer(s) performs inspector accompaniments of a representative number of the State's LLRW inspectors. The reviewer(s) can record their observations of the accompaniment using the *Inspector Accompaniment Summary Sheet* which can be found in the IMPEP Toolbox on the state communications portal Web site.
- b. The reviewer(s) should:
  - i. Address the completeness of the inspections to cover LLRW disposal activities outlined in IMC 2401 including timeliness and follow-up on inspection findings.

- ii. Review inspection documentation and interview inspectors to gain an understanding of the risk significance of radiological hazards at an LLRW disposal facility.
- iii. Determine whether inspection findings, including violations, are communicated to the licensee in accordance with Agreement State procedure
- iv. Ensure that inspections focus on radiological safety aspects, implementation of safety procedures, potential effluent releases to the environment, public and worker's exposure, and release surveys for equipment, structures, and vehicles.
- v. Ensure the inspections address the quality and adequacy of environmental monitoring data (e.g., air, soil, surface-water, and ground water) and evaluation of data, if applicable, for potential radionuclide releases above threshold limits has been properly addressed.
- vi. Review inspection data regarding the quality and performance of liners and covers placed at the LLRW disposal facility, to ensure compliance with the required standards. Not all facilities may utilize liners and covers.
- vii. Review inspection records for waste shipments, to ensure that radiological, physical, and chemical characteristics of the waste are consistent with license requirements and NRC's and DOT's regulations and guidance.
- viii. Interview staff to ensure there are radiological monitoring and surveys of any potential on-site and off-site residual contamination.

4. Technical Quality of Licensing Actions (see SA-104)

During the operations phase, the pre-licensing and construction activities may require a review of licensing actions regarding site selection, site performance assessment, disposal cell designs, establishment of license conditions and technical specifications of liners and engineering barriers. The pre-operational activities may require examination of Agreement State licensing actions regarding each component of the LLRW disposal facility. These components may include engineering systems and planned disposal operations or processes. The operations phase may require modifications of license conditions, expansion of LLRW disposal activities, mitigation measures, site security, modification of cell design, and financial assurance. The following specific review guidelines may apply to the LLRW Disposal Program reviews.



- a. The reviewer(s) should:
- i. Evaluate a sample of licensing actions (e.g., site performance assessments, renewals, amendments) that are representative based on the number and type of actions performed during the review period. As practical, a cross-section of as many different technical reviewers and types of actions should be included.
  - ii. Ensure that selected licensing actions have been reviewed for technical correctness and quality, including adequacy, accuracy, completeness, clarity, specificity, and consistency.
  - iii. Ensure that when the Agreement State examines the licensee's technical documents, the Agreement State provides a technical basis supporting their licensing decision and actions specifically any risk-significant decisions related to health and safety. The basis for licensing actions should be documented.
  - iv. Ensure that selected licensing actions conform to applicable regulations and license conditions, based on regulatory guidance, checklists, and policy memoranda, to ensure consistency with current accepted practice and standards.
  - v. Determine whether NRC guidance is used or if the Agreement State has developed their own guidance to perform licensing reviews. If the Agreement State developed their own guidance, the reviewer(s) should evaluate the guidance for technical adequacy and compatibility with NRC procedures.
  - vi. Review records that document deficiencies in licensee supporting information, including risk-significant errors, omissions, or missing information. Such records include letters, file notes of a telephone conversation, and other documents.
  - vii. Determine that licensing actions are issued and signed by an authorized official in accordance with the Agreement State procedure.
  - viii. Verify the justifications of the technical licensing review whereby the Agreement State Program granted an exception, exemption, variance, or waiver from an applicable rule, regulatory guide, or industry standard.
  - ix. Determine how the Agreement State Program ensured adequate financial assurance has been maintained for site closure in accordance with regulatory requirements and applicable guidance. This includes ensuring that the closure fund has the necessary funds or has reasonable assurance of obtaining the necessary

funds, or a combination of the two to cover the estimated costs of conducting all licensed activities over the planned operating life of the project, including costs of construction and disposal (See Subpart E of 10 CFR Part 61).

- x. If the reviewer identifies a performance issue regarding one or more aspects of the technical review of licensing action(s), then the number of licensing actions reviewed should be increased. The reviewer will determine the root cause and extent of the issue and identify if the issue represents a programmatic weakness. The finding, if any, should be documented in the report.

5. Technical Quality of Incident and Allegation Activities (see SA-105)

a. The reviewer(s) should:

- i. Coordinate with the RSAO and the headquarters allegation team to obtain a listing of the LLRW disposal concerns and allegations the NRC referred to the Agreement State Program.
- ii. Review the Agreement State Program's incident and allegation procedures.
- iii. Examine a representative number of incidents and allegations files from the entire review period. All reportable incidents and allegations should be reviewed, if possible.
- iv. Focus on: (a) risk-significant aspects; (b) discernment of root causes; (c) confidentiality and protection of alleged's identity; (d) conformance to the Program's procedures, (e) follow-up actions for closure of allegations, and (f) follow-up actions for incidents.
- v. Review LLRW disposal facility event records entered in the Nuclear Material Events Database (NMED). The reviewer(s) should verify whether event actions and notifications are conducted as specified in SA-300, *Reporting Material Events*.

D. Reviewer Actions During the Closure Phase

The term *closure* is typically used to encompass LLRW disposal activities that must be carried out to allow issuance of a license amendment for the disposal-site closure. The LLRW disposal-site closure is followed by a period of *post-closure* (observation and maintenance) then *institutional control* for observation of performance, environmental monitoring program at the disposal site, periodic surveillance, and minor custodial care. The post-closure period, typically 5 years (see 10 CFR Part 61.29), is followed by an institutional control period of up to 100 years (see 10 CFR Part 61.7(b)(4) and 10 CFR Part 61.59(b)). The licensee develops a site closure plan for review and approval by the Agreement State Program.

1. The reviewer will evaluate the five sub-elements as noted above in Section D but will tailor the review to closure phase activities.
2. The reviewer(s) should include the following:
  - a. The reviewer(s) performs inspector accompaniments of a representative number of the State's LLRW inspectors. The reviewer(s) can record their observations of the accompaniment using the *Inspector Accompaniment Summary Sheet* which can be found in the IMPEP Toolbox on the state communications portal Web site.
  - b. Focus on the review of the site-closure plan approved by the Agreement State and implementation activities associated with any portion of the plan and should also be familiar with closure phase inspection procedures listed in IMC 2401 during the closure and post-closure periods
  - c. Evaluate conformance with applicable regulations under 10 CFR Part 20 (Standards for Protection against Radiation) and 10 CFR Part 61 (Licensing Requirements for Land Disposal of Radioactive Waste) during the site-closure and post-closure periods. Conformance with license conditions and applicable regulations to these phases (e.g., 10 CFR Part 61.26 through 61.31 or Agreement State compatible regulations) must be evaluated.
  - d. Evaluate the Agreement State Program inspections during the closure phase to ensure that the licensee has implemented all elements of the closure plan and the Agreement State has approved initiation of the post-closure observation and maintenance.
  - e. Determine if the Agreement State Program examined monitoring and observational data collected by the licensee during the closure and post-closure phases. The reviewer(s) should assess if the licensee compared the data to the performance assessment and site stability analysis results generated during earlier phases of facility operation. If the data did not agree with the analysis, the reviewer(s) should determine if modifications were made to the analysis or facility design, or if the differences were determined to be insignificant to public health and safety.
  - f. Review the closure and post-closure period licensing actions. These licensing actions may involve on-site, buffer zone, and off-site environmental monitoring activities, mitigation and clean-up measures, and financial assurance and institutional control issues.
  - g. Review the following activities, as applicable during the institutional control phase:
    - i. LLRW disposal-site record keeping;

- ii. review of site safety and security;
- iii. review of environmental monitoring data and records and follow-up, as appropriate based on trend analysis;
- iv. review of disposal site performance records for conformance with the safety criteria in 10 CFR Part 20 and 10 CFR Part 61;
- v. review of site repair and maintenance activities and records;
- vii. review of financial assurance records; and
- viii. activities pertaining to license transfer, termination, and institutional controls.

**E. Evaluation Process**

1. The reviewer should refer to Part III *Evaluation Criteria*, of MD 5.6 for specific evaluation criteria. As noted in MD 5.6, the criteria for a satisfactory program is as follows:
  - a. The LLRW Disposal Program meets the “satisfactory” finding for the common performance indicators, Technical Staffing and Training, Status of Materials Inspection Program, Technical Quality of Inspections, Technical Quality of Licensing Actions, and Technical Quality of Incident and Allegation Activities as described in Sections III.B.1, III.C.1, III.D.1, III.E.1, and III.F.1 of the handbook in MD 5.6.
  - b. The LLRW disposal licensees are inspected at prescribed frequencies in accordance with IMC 2401 or compatible Agreement State procedure for a LLRW disposal facility. Any deviations from these schedules are coordinated and documented. IMC 2401 describes the specific radiological safety inspection program for near surface LLRW disposal facilities and defines specific inspection requirements.
  - c. Agreement State Program procedures are compatible with this procedure and are implemented and followed.
2. In applying the criteria, the reviewer(s) should consider the current phase of the life cycle of the LLRW disposal facility during the review period.
3. The reviewer should evaluate any open issues or recommendations for closure or modification.
4. The reviewer(s) will evaluate each sub-element for this non-common performance indicator as outlined in this procedure and the respective IMPEP performance indicator procedures (SA-101, SA-102, SA-103, SA-104, and SA-105).

5. A list of examples to assist the reviewer in identifying less than satisfactory findings of program performance can be found in the IMPEP Toolbox on the state communications portal Web site.

F. Discussion of Findings with the Radiation Control Program

1. The reviewer should follow the guidance given in NMSS Procedure SA-100, *Implementation of the Integrated Materials Performance Evaluation Program (IMPEP)*, for discussing technical findings with staff, supervisors, and management.
2. If the IMPEP review team identifies programmatic performance issues, the IMPEP review team should seek to identify the root cause(s) of the issues, which can be used as the basis for developing recommendations for corrective actions. The NMSS procedure SA-100 contains criteria regarding the development of recommendations by the IMPEP team.
3. The reviewer(s) will provide one overall rating for this indicator.

## VI. REFERENCES

Management Directives (MD) available at <https://scp.nrc.gov>

NMED is available at <https://nmed.inl.gov/>

NMSS SA Procedures available at <https://scp.nrc.gov>

NRC Allegation Manual at <https://www.nrc.gov/docs/ML1700/ML17003A227.pdf>

NRC Inspection Manual Chapters available at <https://www.nrc.gov/reading-rm/doc-collections/insp-manual/manual-chapter/>

NRC Inspection Procedures available at <https://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/>

Title 10 *Code of Federal Regulations* available at <https://www.nrc.gov/reading-rm/doc-collections/cfr/>

IMPEP Toolbox (e.g., specific material reference list, examples of a less than satisfactory program, and inspector accompaniment summary sheet) available at <https://scp.nrc.gov/impeptools.html>

## VII. ADAMS REFERENCE DOCUMENTS

For knowledge management purposes, all previous revisions of this procedure, as well as associated correspondence with stakeholders that have been entered into NRC's Agencywide Documents Access and Management System (ADAMS) are listed below.

<b>No.</b>	<b>Date</b>	<b>Document Title/Description</b>	<b>Accession Number</b>
1	7/2/2004	STP-04-047, Opportunity for Comments on Draft of Two New IMPEP Procedures Regarding Review of Uranium Recovery Programs and Low-Level Waste Programs	ML041880157
2	6/20/05	STP Procedures SA-109, Reviewing the Non-Common Performance Indicator, Low-Level Radioactive Waste Disposal Program (Redline/Strikeout Version)	ML061640294
3	6/20/05	Summary of Comments on SA-109	ML061640301
4	5/16/06	STP Procedures SA-109, Reviewing the Non-Common Performance Indicator, Low-Level Radioactive Waste Disposal Program	ML061640290
5	6/30/05	STP-05-050, Final STP Procedure SA-109	ML051810484
6	7/14/09	NMSS-09-051, Opportunity to Comment on Draft Revisions to SA-108 and SA-109	ML091330602
7	7/14/09	NMSS Procedure SA-109 Draft Revision	ML091330114
8	1/22/10	Procedure SA-109, Reviewing the Non-Common Performance Indicator, Low-Level Radioactive Waste Disposal Program	ML092740597
9	12/18/19	NMSS Procedure SA-109 Draft Revision	ML19316A954
10	7/1/20	Resolution of Comments	ML20188A165
11	9/15/20	Final NMSS Procedure SA-109	ML20184A085